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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Syuhei OKUDE et al.

Application No.: 10/584,412

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Art Unit: 1794

For: POLARIZING PLATE PROTECTIVE FILM, REFLECTION PREVENTIVE POLARIZING PLATE AND OPTICAL PRODUCT

Examiner: E. A. Robinson

DECLARATION UNDER 37 CFR § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Madam:

I, Mr. Hiroshi Yakabe, declare the following.

I am fully knowledgeable of the disclosure of the above-identified application and the field of art of the present invention. I have read and understand the Office Action dated October 23, 2008 and the references cited therein to Shoshi et al. '188 (U.S. 2003/0104188), Murakami et al. '900 (U.S. 5,681,900), Nakamura et al. '929 (U.S. 2001/0035929) and Nishida et al. (JP 2001-233611).

It is my opinion that the presently claimed polarizing plate protective film which comprises a low refractive index layer comprising a metal oxide complex formed from at least one compound shown by the formula (2): R_aSiY_{4-a} has unexpectedly superior properties to polarizing plate protective films such as those disclosed by the primary references to Shoshi et al. '188 and Nakamura.

In using the compound of formula (2): R_aSiY_{4-a}, the refractive-index of the low-refractive-index layer is lowered (i.e. the reflectance of the polarizing plate protective film is lowered). The resulting polarizing plate protective film has an excellent antireflection function. Moreover, the polarizing plate protective film has an excellent stainproof property by using the compound shown by the formula (2): R_aSiY_{4-a}.

The following experiments were performed by me or under my direct supervision. [1]

(1) Preparation of coating composition 4

A tetramethoxysilane oligomer ("Methyl Silicate 51" manufactured by Colcoat Co., Ltd.), heptadecafluorodecyltrimethoxysilane, methanol, water, and a 0.01N hydrochloric acid solution were mixed at a weight ratio of 7:14:36:2:2. The mixture was stirred at 25°C for two hours in a high-humidity bath to obtain a silicone resin with a weight average molecular weight of 850. A hollow silica isopropanol dispersion sol (manufactured by Catalysts & Chemicals Industries Co., Ltd., solid content: 20 wt%, average primary particle diameter: about 35 nm, shell thickness: about 8 nm) was added to the silicone resin so that the weight ratio of "porous silica micropar-ticle/silicone resin (converted into condensation compound)" was 7:3 (solid content). The mixture was diluted with methanol so that the total solid content was 1 wt% to ob-tain *coating composition 4*.

(2) Preparation of polarizing plate protective film 3I

After allowing the *coating composition 4* to stand for one hour after its preparation, the *coating composition 4* was applied to the *hard coating layer stacked*

[1] Please note that the numbering/lettering used herein is not perfectly sequential, since I have retained the numbering/lettering of the experiments which coincide with the Examples in the present specification and the Examples provided in the Declaration filed July 31, 2008.

film 2I using a wire bar coater to form a coating with a thickness of about 100 nm. After allowing the coating to dry for one hour, the coating was heated at 120°C for 10 minutes in air to obtain a *polarizing plate protective film 3I* on which the cured coating was formed.

(3) Measurements

The refractive indices of the low-refractive-index layer and the hard coating layer, the reflectance, the outward appearance of the film after the steel wool test, the total light transmittance and the haze before and after the steel wool test, and the warping rate (%) were measured using the *polarizing plate protective film 3I*.

The measurement results for the *polarizing plate protective film 3I* are summarized in Table B.

[Table B]

	Polarizing plate protective film	Refractive index of hard coating layer	Refractive index of low-refractive-index layer	Reflectance	Outward appearance of film after steel wool test	Before steel wool test		After steel wool test		Warping rate (%)
						Total light transmittance (%)	Haze (%)	Total light transmittance (%)	Haze (%)	
Example 11	3I	1.53	1.23	0.2	Excellent	95.0	0.5	95.1	0.5 1	0.5 0

As shown in Table B, the refractive-index of the low-refractive-index layer is lowered (i.e. the reflectance of the polarizing plate protective film is lowered) by using the compound shown by the formula (2): R_aSiY_{4a} (heptadecafluorodecyltrimethoxysilane) and we can obtain a *polarizing plate protective film (3I)* having an excellent antireflection function.

Moreover, we can obtain a polarizing plate protective film having an excellent stainproof property by using the compound shown by the following formula (2): R_aSiY_{4-a} (heptadecafluorodecyltrimethoxysilane) as described in paragraphs (0073) and (0074) of the present specification.

It is my opinion that the presently claimed polarizing plate protective film which comprises a low-refractive-index layer comprising the compound shown by the formula (2): R_aSiY_{4a} and the excellent properties associated therewith are not made obvious by Shoshi et al. '188, Murakami et al. '900, Nakamura et al. '929 and Nishida et al.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Hiroshi Yakabe
Mr. Hiroshi Yakabe

April 23, 2009
Date